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TOWNSEND and TOWNSEND and CREW LLP

By: _____

PATENT
Attorney Docket No. 15283A-008600US
Client Ref. No. LS11-03_947,03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No. 6267
INGOLF BRAUNE, ET AL.	Examiner: Teresa Bonk
Application No. 10/579,133	Technology Center/Art Unit: 3725
Filed: December 18, 2006	APPELLANTS' BRIEF UNDER 37 CFR §41.37
For: SAFETY METHOD AND SAFETY DEVICE FOR A MACHINE, ESPECIALLY A BENDING PRESS	
Customer No. 20350	

San Francisco, CA 94111
April 15, 2009

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
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Sir:

Appellants herewith submit this Appeal Brief in response to the Final Rejection dated September 17, 2008. A Notice of Appeal was filed February 17, 2009.

The Commissioner is authorized to deduct the Appeal Brief fees, and any additional fees associated with this Brief and/or this application, to Deposit Account No. 20-1430.

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1. REAL PARTY IN INTEREST

The real party in interest of the present patent application is the assignee of the application, Sick AG, of Waldkirch, Germany.

2. RELATED APPEALS AND INTERFERENCES

None.

3. STATUS OF CLAIMS

Claims 1-12 are pending and rejected. The rejection of claims 1-12 is appealed herewith.

4. STATUS OF AMENDMENTS

This Appeal is taken in response to the Final Rejection of September 17, 2008. No Amendments have been filed since the Final Rejection issued.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The rejected claims are directed to methods (claims 1-7) and apparatus (claims 8-12) for securing the moving parts of machines, such as the dies of a press brake, for example, to prevent accidental injuries to operators of such machines and persons in the vicinities thereof.

Press brakes, for example, have opposing dies between which a workpiece such as sheet metal is deformed. Such press brakes have first and second dies, referred to as tool parts in the claims, which move towards each other during a press braking operation. Typically one of the dies is stationary while the other one moves towards and away from the stationary die during use. During relative movement of the tool parts, an opening gap between them gradually closes. An optoelectronic sensor monitor is attached to one of the tool parts and defines a protected zone which precedes, that is, which extends forward (in the direction of movement) of, one of the tool parts relative to the other tool part. In the event the protected zone is breached, for example by an intruding hand of a person, a switching signal is generated which is used to stop the tool part and prevent the operator from injuring his hand. As the size of the opening gap between the tool

parts becomes less relative to the size of the protected zone, the protected zone is correspondingly reduced during movement of the tool part in the movement direction towards the other tool part so that, during further closing movements of the tool part, substantially the entire opening gap is within the protected zone.

A principal advantage of the present invention is that, towards the end of an operating cycle, the protected zone is given the largest possible size to provide optimal security and protection. Thus, as the opening gap becomes smaller in the direction of movement than the protected zone, the protected zone is not deactivated (or muted, in the terminology of the present application) to allow the machine operation to continue, but instead the protected zone, together with the opening gap, is continuously reduced in size. Since the entire surface of the protected zone is monitored, an optimal protection is thereby assured because the entire opening gap is monitored, especially during the final phases of the operating cycle when the danger is greatest because the opening gap is about the close. (Paragraph [0007] of the present application, hereinafter referred to as "[0007]")

Independent method claim 1 is directed to securing a machine 10 which has first and second tool parts 12, 14 that define an opening gap 22 between respective opposing edges 18 and 20 of the tool parts. At least one of the tool parts is movable relative to the other tool part in the movement direction so that, during an operating cycle, the size of the opening gap 20 gradually diminishes. [0023] (Figs. 1, 2a, 2b) When a workpiece is to be bent, for example, a protected zone 36 precedes the first tool part and extends over at least a portion of the opening gap in the direction of relative movement between the two tool parts. [0007] (Figs. 1 and 2a)

The protected zone as such is formed by a light emitter 30 that directs a light beam 34 to a light receiver 32, both mounted, for example, at the longitudinal ends of upper die 12. [0024]

Claim 1 requires that the entire area of the protected zone 36 that is transverse to the movement direction, or at least a periphery of the area, is monitored with an optoelectronic sensor. [0007] The optoelectronic sensor is defined by light emitter 30 and light receiver 32, both mounted at the respective longitudinal ends of upper die 12, as shown in Fig. 1. [0024]

When the protected zone 36 is breached, the optoelectronic sensor generates a danger signal. [0026]

When the size of the opening gap 22 between the tool parts 12, 14 in the movement direction becomes smaller than the protected zone 36, the size of the protected zone in the movement direction of the tool parts is continuously reduced. [0007] (Figs. 2b-2d) As a result, during subsequent further closing movements of the first tool part 12, for example, substantially the entire opening gap 22 is within the protected zone. [0027] (Fig. 2d)

Independent apparatus claim 8 protects objects entering a dangerous zone of a machine, such as a press brake, from injuries and/or damage. [0007] The apparatus has first and second tool parts 12, 14, which are mounted for relative movement of the first tool part 12 in a closing direction towards the second tool part 14. An opening gap 22 is formed between the tool parts. [0023]

The apparatus defined by claim 8 has an optoelectronic sensor for monitoring the opening gap 22 and includes a light emitter 30 that generates a light beam 34 which illuminates either the entire area of the opening gap that is transverse to the closing direction or a periphery of that area. [0024]; [0007] A light receiver 32 receives the light beam 34 from the light emitter 30 ([0024]) and a control unit 24 generates a danger signal when an intrusion into the protected zone 36 is detected. [0026]

The light emitter 30 and the light receiver 32 are configured so that, when the opening gap 22 becomes reduced as the first tool part 12 moves in a closing direction, the protected zone is continuously reduced in the closing direction. As a result, during further movements of at least one of the first or second tool parts 12, 14, the entire opening gap 22 is within the protected zone 36. (Figs. 2c and 2d)

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Are claims 1 and 7-12 anticipated by published U.S. Patent Application No. 2003/0062469 to Braune et al. (hereinafter "Braune")?

B. Are claims 1-3, 7, 8 and 10 anticipated by published U.S. Patent Application No. 2002/0104958 to Fiessler (hereinafter "Fiessler")?

C. Are claims 4-6 obvious over Fiessler in view of published U.S. Patent Application No. 2002/0017603 to Haberer et al. (hereinafter "Haberer")?

7. ARGUMENT

A. Claims 1 and 7-12 are not anticipated by Braune

Claims 1 and 7-12 were rejected for anticipation by Braune because, amongst others, the Final Rejection asserted that the light emitter and the light receiver of Braune are "configured so that when the opening gap becomes reduced as the first tool part moves in the closing direction, the protected zone is continuously reduced in the closing direction and so that during further movement of at least one of the first and second tool parts the entire opening gap is within the protected zone (Paragraph 0044)". (Final Rejection, page 3)

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631; 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Thus, for anticipation the "identical invention must be shown in as complete detail as is contained in the ... claim". *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236; 9 USPQ2d 1913, 1920 (Fed. Circ. 1989). MPEP §2131.

For the reasons discussed below, Braune does not disclose what is asserted in the above-copied paragraph of the Final Rejection.

In Figs. 5a, b, Braune discloses a known bending press, and in Figs. 1-4 Braune illustrates the actual invention.

Figs. 5a, b and the associated description in paragraphs [0041]-[0044] of Braune show and describe upper and lower tool parts 11, 12 which are moved towards each other for shaping purposes. A light transmitter 19 directs a light beam or bar 23 to a light receptor 21 located at the opposite side of the upper tool bar. Fig. 5b shows that the light beam 23 does not occupy the full cross-section of hazardous zone 17 between the upper and lower tool parts, but provides no teaching that when the opening gap becomes reduced, the protected zone (defined by light beam 23) is also reduced so that during further movements the entire opening gap is within the protected zone.

Paragraph [0044] relied on in the anticipation rejection of the claims teaches that a "switching off process is triggered to stop the closing movement 15 of the upper tool 11. Such a switching off process takes place, for example, when a hand of the operator is located in the lower part of the hazardous zone." No part of [0044] mentions continuously or otherwise reducing the size of the protected zone (which, in Figs. 5a, b of Braune is defined by light beam 23). [0044] only discloses that when the light beam is interrupted, the closing movement 15 of the upper tool 11 is stopped.

Thus, [0044] of Braune does not disclose what was asserted and relied upon in the Final Rejection relative to reducing the size of the protected zone in the closing direction as recited in independent claims 1 and 8 of the present application.

In the "Response to Arguments" section of the Final Rejection (on pages 7 and 8), the Examiner maintained that Braune discloses "continuously reducing the size of the protected zone ... so that during subsequent closing movements ... substantially the entire opening gap is within the protected zone". [0056] of Braune was thought to support this assertion.

In fact, Braune contains no disclosure anywhere concerning a reduction of the protected zone in the closing direction as the opening gap between the two parts becomes smaller. [0056] of Braune expressly teaches that there is no reduction of the protected zone in the closing direction as required by the appealed independent claims of the present application:

> As soon as the upper tool 11 and the monitored zone 29 have reached the location shown in FIG. 1*b*, a switch is made from the fast closing movement 15 to a comparatively slow working movement by which the workpiece 25 should be shaped. At the same time, the monitoring is deactivated. The protection of the operator is now realized by the slow closing movement or working movement. ([0056], underlining added)

Far from disclosing that the size of the protected zone is continuously reduced during closing movements so that substantially the entire opening gap is within the protected zone, as required by the independent claims on appeal, [0056] of Braune explicitly states the opposite, namely that monitoring is deactivated.

Being apparently troubled by this express statement in [0056], the Examiner maintains in the "Response to Arguments" section of the Final Rejection that Figs. 1a and 1b

disclose that the size of the opening gap becomes smaller than the protected zone. No such disclosure can be found in Figs. 1a and 1b of Braune. In both figures, the protected or monitored zone 29 consists of a circular arc portion 33 on top of a residual height portion 43 (shown in Fig. 1a) adjoining the lower end of the circular arc portion. The size of the monitored zone 29 in Figs. 1a and 1b of Braune appears to be identical. For example, the center point 35 of circular arc 33 is located the same distance above the lower horizontal section 45 of the monitored zone. There is also no mention anywhere in the specification of Braune that the size of the opening gap becomes smaller than the protected zone because, as stated above, [0056] of Braune expressly states that the monitoring is deactivated when the upper tool 11 reaches the position shown in Fig. 1b, a position at which the opening gap (between upper tool point 27 and workpiece 25) is still larger than the monitored zone.

Braune clearly does not disclose, and it is also not inherent in Braune, to continuously reduce the size of the protected zone (in the movement direction) once the size of the opening gap becomes smaller than the protected zone, because when this occurs in Braune, the zone protection or monitoring is switched off.

Independent claim 1

Claim 1 of the present application requires in relevant parts "when a size of the opening gap in the movement direction becomes smaller than the protected zone in the movement direction, continuously reducing the size of the protected zone in the movement direction of the first tool part so that during subsequent closing movements of the first tool part substantially the entire opening gap is within the protected zone".

For the reasons discussed above, Braune does not disclose or in any way suggest such a limitation. Indeed, as discussed above, Braune teaches the opposite, namely deactivating the monitored zone once the tool point 27 approaches the workpiece and, thereafter, foregoing the protection provided by the monitored zone and relying solely on a slower movement of the tool for protecting the operator's hand. This would provide no protection, for example, for an operator who moved his hand too slowly in order not to be caught by the closing upper die.

Braune therefore does not anticipate claim 1 because Braune does not teach the foregoing limitation of claim 1, and this limitation is also not inherent in Braune.

Independent claim 8

Unlike claim 1, claim 8 is an apparatus claim and it employs apparatus terminology. Substantively, however, claim 8 is directed to the same inventive features as were discussed above in connection with claim 1. Thus, in relevant parts claim 8 recites:

> ... the light emitter and the light receiver being configured so that when the opening gap becomes reduced as the first tool part moves in the closing direction, the protected zone is continuously reduced in the closing direction and so that during further movements of at least one of the first and second tool parts the entire opening gap is within the protected zone.

Braune does not have a light emitter and a receiver configured to continuously reduce the protected zone as the opening gap between the two parts becomes reduced. The protected zone of Braune at all times remains the same, namely monitored zone 29, which is defined by a circular arc 33 and the residual height 43 at the lower end of the circular arc as illustrated in Figs. 1a and 1b.

As a result, during further movement of the tool part(s), the entire opening gap of Braune is not and cannot be within the protected zone as recited in claim 8. During such further movement of the tool part of Braune, the entire protected zone vanishes because it is being deactivated.

At least for this reason, as well as for the reasons extensively discussed above, Braune does not disclose this limitation of claim 8.

Accordingly, Braune does not anticipate claim 8 because Braune does not teach the foregoing limitation of claim 8, and this limitation is also not inherent in Braune.

Dependent claim 9

Claim 9, which depends from claim 8, requires that the light beam from the light emitter has a cross-section "at the light receiver which is greater than and completely illuminates the light receiver".

The Final Rejection asserts that Fig. 5 of Braune, as well as [0043] and [0068] of Braune, disclose that the cross-section of the light beam completely illuminates the light receiver. This is not the case.

Figs. 5a, b of Braune show the cross-section of the light beam or bar 23 (in Fig. 5b) but nowhere show the cross-section of light receptor 21. Thus, the assertion that Fig. 5 discloses an arrangement in which the light beam covers the entire light receiver is based on speculation not supported by the drawing.

[0043] of Braune discloses that the light bar 23 has a rectangular cross-section and extends within the hazardous zone 17. However, [0043] nowhere discloses that the rectangular cross-section of the light beam is greater than and completely illuminates the light receiver.

[0068] of Braune refers to Figs. 1-4 thereof (none of which show that the light beam illuminates the entire light receiver as required by claim 9) and discusses the radial extent of the monitored zone 29 or its boundary surface 31, but nowhere mentions the size of the light beam relative to the light receiver.

Braune does not disclose the features of claim 9, and claim 9 is therefore not anticipated by Braune.

Dependent claims 7 and 8-12 depend from their respective allowable parent claims 1 and 8. These claims are therefore allowable because they depend from allowable parent claims.

B. Claims 1-3, 7, 8 and 10 are not anticipated by Fiessler

Fiessler discloses a press brake having upper and lower tools 10, 11 which are moved towards each other for working, e.g. bending, a sheet metal 14 between them as is illustrated in Fig. 1. [0017] First and second photoelectric detectors 19, 20 generate a pair of vertically spaced-apart laser beams 23, 24 which are arranged below the lower edge of top tool 11 and extend over the length of the tool. The lower photoelectric detector, and its laser beam 23, serve as a guard photoelectric detector, should some object happen to be in the path of motion. [0021] Fiessler's device operates as follows:

> Initially, the control means 31 moves the top tool at a high speed as far as a position just short of the bottom tool 11 or, respectively, the sheet metal 14 to be worked on and then switches over to a lower working speed at which such sheet metal 14 is shaped. The switching over to the lower speed in this case takes place

> intermediate the top tool 10 and the bottom tool 11 at a position in which the beam 23 has not yet been interrupted by the sheet metal or the bottom tool 11 so that a stop means 32, under the control of the photoelectric detector, will not yet have abruptly arrested the working movement of the top tool at the point in time of switching over to the lower braking speed owing to the interruption of the light beam 23 .... ([0027])

The press brake of Fiessler also includes a speed comparison means 34 which compares the measured speed of the top tool to a lower threshold speed. [0027] When the lower laser beam touches the sheet metal (or the lower tool), the comparison means 34 functions as follows:

> The speed comparison means 34 accordingly causes automatically deactivating the stop means 32 and switching over to the lower working speed and it causes it to remain deactivated in the course of the upward displacement of the top tool 10, that is to say, during return movement. ([0028], underlining added)

Thus, when movement of the top tool is changed over to the lower speed, at a position where the beam has not yet been interrupted by the sheet metal or the bottom tool 11 ([0027]), the comparison means 34 automatically deactivates the stop means 32. From that moment on, during further closing movements of the top tool, Fiessler has no protected zone because the stop means 32, which could arrest movement of the upper tool, has been deactivated.

The situation is the same in the embodiment of Fiessler shown in Fig. 3. There, a third, lower laser beam 22 is positioned below top tool 10 at a distance "s" from laser beam 23 discussed above. Laser beam 22 is the first beam that will strike sheet metal workpiece 14 that is to be deformed. When this occurs, the stop means is deactivated only with regard to the lowermost laser beam 22 [0034] and the movement speed of the top tool is reduced. Its downward movement continues over a predetermined distance "s" at the reduced speed until the next higher laser beam 23 is interrupted by the bottom tool 11. The distance between the upper laser beams 23, 24 is sufficiently small that there is no danger of any part of the operator's body being introduced into the remaining narrow slot. [0035]

Only after the top tool 10, following changing to the slow working speed due to laser beam 22 contacting the sheet metal 14, has moved a distance equal to or less than the predetermined stroke "s" will the stop means be completely deactivated. [0034]

Thus, as is true for the embodiment of Fiessler in Fig. 1, in the embodiment of Fig. 3 the stop means becomes completely deactivated and thereby eliminates any protected zone between the tool parts before laser beam 23 (between beams 22 and 24 in Fig. 3) has been interrupted by the sheet metal workpiece or the bottom of tool 11. This is considered acceptable because "the distance between the laser beams 23 and 24 is made so small ... that there is no danger of any part of the operator's body being introduced into the remaining narrow slot". [0035], last sentence

As a result thereof, at all times during which Fiessler's protected zone is active and the tool moves at either its full or reduced speed, the size of the opening gap (between the lower edge of top tool 10 and sheet metal 14, or the upper edge of bottom tool 11) is greater than the protected zone. At no time during movement of the top tool towards the bottom tool does this gap become smaller than the protected zone.

Further, once laser beam 23 has been interrupted by the sheet metal (or the top of the bottom tool), the stop means is completely switched off, although the top tool still has to travel over the distance between beams 23 and 24 before the gap between the upper and lower tools becomes closed.

At no time during the operation of Fiessler's press brake is the size of the protected zone continuously reduced in the movement direction of the top tool. In Fiessler the protective zone is on until laser beam 23 strikes the sheet metal, at which point the protective zone is switched off completely. Fiessler's protective zone is either on or off.

Independent method claim 1

In relevant parts, the claim requires "when a size of the opening gap in the movement direction becomes smaller than the protected zone in the movement direction, continuously reducing the size of the protected zone in the movement direction of the first tool part ...."

As above discussed, in Fiessler the size of the opening gap never becomes smaller than the protected zone in the movement direction. This feature is not disclosed or in any manner suggested by Fiessler.

In relevant parts, claim 1 further requires "continuously reducing the size of the protected zone in the movement direction of the first tool part ...."

As set forth above, Fiessler does not continuously reduce the size of the protected zone in the movement direction of the first tool part. In Fiessler the protected zone is either on (while the stop means is activated) or off (when the stop means is deactivated). In Fiessler the size of the protective zone is never continuously reduced.

Finally, claim 1 requires that "during subsequent closing movements of the first tool part substantially the entire opening gap is within the protected zone".

As discussed above, at no time during closing movements following the deactivation of the stop means is the entire opening gap within the protected zone because at that point there is no longer a protected zone.

Fiessler discloses none of the foregoing features of claim 1. Accordingly, for each of the three reasons separately set forth above, Fiessler does not anticipate claim 1.

Independent apparatus claim 8

Claim 8 differs from claim 1 primarily in that it employs apparatus terminology, while claim 1 uses method terminology. Substantively, however, the two claims are directed to comparable features of the present invention.

Thus, claim 8 requires amongst others a light emitter and a light receiver "configured so that when the opening gap becomes reduced as the first tool part moves in the closing direction, the protected zone is continuously reduced in the closing direction ...."

As was discussed in connection with claim 1, in Fiessler the protective zone is never continuously reduced. It is either on or off.

Claim 8 further requires that "during further movements of at least one of the first and second tool parts the entire opening gap is within the protected zone".

As was discussed in connection with claim 1, in Fiessler the opening gap is always larger than the protected zone, while the stop means remains activated, and when the stop

means is deactivated, Fiessler has no protected zone. Fiessler nowhere discloses or in any form suggests an arrangement in which the entire opening gap could be within the protected zone.

For each of the two reasons stated above, Fiessler does not anticipate claim 8.

Dependent claim 9

The claim requires that the cross-section of a light beam is greater than and completely illuminates the light receiver.

As was discussed above in connection with the rejection of claim 9 over Braune, Fiessler nowhere discloses that the cross-section of the light beam is greater than the light receiver so that the latter is completely illuminated.

Claim 9 is therefore not anticipated by Fiessler.

Dependent claims 2, 3 and 10-12

These claims are allowable because they depend from allowable parent claims 1 and 8, respectively.

C. Claims 4-6 are not obvious over Fiessler in view of Haberer

Claim 4, from which claims 5 and 6 depend, requires deactivating at least a portion of the protected zone as a function of the size and/or geometrical shape of the workpiece. The claim was rejected for obviousness over Fiessler in view of Haberer because Fiessler was viewed as disclosing the claimed invention except for deactivating the protected zone as a function of the size or shape of the workpiece, which was considered disclosed by Haberer. The Final Rejection asserts that Haberer deactivates the protected zone as a function of the size of the workpiece after the workpiece has entered the protected zone. The Examiner therefore considered it obvious to one of ordinary skill in the art to permit the deactivation by the presence of the workpiece.

Haberer discloses what is commonly referred to as a light curtain which has a number of individual light beams 2-9 that are spaced from each other and arranged in a common plane. When any portion of an object penetrates the plane of the light curtain and interrupts one or more of the light beams, a corresponding signal is generated, for example to shut off a machine behind the light curtain.

To deactivate the light curtain of Haberer in dependence on the size and/or geometrical shape of the workpiece, the light curtain would need to be in a position to measure the height and width of the workpiece, which is not possible with a light curtain. To measure the height of the object, for example, it would become necessary to individually turn off some of the light beams, and measuring the width of the workpiece (parallel to the light beams) is not possible with the light curtain of Haberer.

Haberer only discloses a planar light curtain which is deactivated when an object breaks through the plane of the light curtain. No part of Haberer contains any disclosure concerning measuring the size or geometric shape of the workpiece as required by claim 4.

Haberer therefore does not disclose what is missing from Fiessler with regard to claim 4. In view thereof, claim 4 is not obvious over Fiessler in view of Haberer.

Claims 5 and 6, which depend from claim 4, are directed to specific subfeatures of claim 1, and the claims are allowable because they depend from their allowable parent claims 1 and 4.

8. CONCLUSION

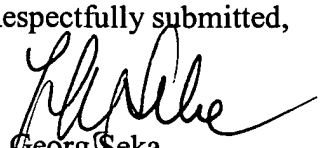
A. Claims 1 and 7-12 are not anticipated by Braune.

B. Claims 1-3, 7, 8 and 10 are not anticipated by Fiessler.

C. Claims 4-6 are not obvious over Fiessler in view of Haberer.

In view thereof, Appellants request that the rejection of all pending claims 1-12 be reversed.

Respectfully submitted,



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9. CLAIMS APPENDIX

Claim 1 (previously presented): A method of securing a machine having first and second tool parts that define an opening gap between them, at least the first tool part being movable relative to the second tool part in a movement direction so that during an operating cycle the opening gap is gradually closed, the method comprising generating a protected zone so that it precedes the first tool part and extends over at least a portion of the opening gap in the direction of relative movement, monitoring one of an entire area of the protected zone that is transverse to the movement direction and a periphery of the area with an optoelectronic sensor and generating a danger signal in response to a breach of the protected zone, and when a size of the opening gap in the movement direction becomes smaller than the protected zone in the movement direction, when a size of the opening gap in the movement direction becomes smaller than the protected zone in the movement direction, continuously reducing the size of the protected zone in the movement direction of the first tool part so that during subsequent closing movements of the first tool part substantially the entire opening gap is within the protected zone.

Claim 2 (original): A method according to claim 1 including, during subsequent closing movements, completely deactivating the protected zone after an extent of the protected zone in the movement direction has reached a predetermined minimum.

Claim 3 (original): A method according to claim 1 including dividing a movement speed of the first tool part into a relatively faster, first closing speed and a subsequent, relatively slower second closing speed, and switching from the first closing speed to the second closing speed on the basis of a deceleration ramp or a remaining travel distance for the first tool part established during a preceding test run of the first tool part.

Claim 4 (previously presented): A method according to claim 1 including deactivating at least a portion of the protected zone as a function of the size and/or a geometrical shape of the workpiece.

Claim 5 (original): A method according to claim 4 wherein deactivating occurs after a portion of the workpiece has entered the protected zone.

Claim 6 (original): A method according to claim 4 including determining a position of an upper surface of the workpiece during a test run of the first tool part and then learning and memorizing the position of the upper surface as a contact point between the first tool part and the workpiece.

Claim 7 (original): A method according to claim 1 wherein the machine comprises a bending press.

Claim 8 (previously presented): Apparatus for protecting a dangerous zone of a machine against unwanted entries into the zone comprising first and second tool parts mounted for relative movement of the first tool part in a closing direction towards the second tool part and defining an opening gap between the tool parts, an optoelectronic sensor for monitoring the opening gap including a light emitter for illuminating one of an entire area of the opening gap that is transverse to the closing direction and a periphery of the area with a light beam, a light receiver for receiving the emitted light, and a control unit for generating a danger signal when an intrusion into the protected zone is detected, the light emitter and the light receiver being configured so that when the opening gap becomes reduced as the first tool part moves in the closing direction, the protected zone is continuously reduced in the closing direction and so that during further movements of at least one of the first and second tool parts the entire opening gap is within the protected zone.

Claim 9 (original): Apparatus according to claim 8 wherein the light beam has a cross-section at the light receiver which is greater than and completely illuminates the light receiver.

Claim 10 (original): Apparatus according to claim 7 including means fixedly securing the sensor to the first tool part for movement with the first tool part during an operating cycle of the first tool part.

Claim 11 (original): Apparatus according to claim 8 wherein the receiver comprises a location resolving receiver.

Claim 12 (original): Apparatus according to claim 11 wherein the receiver comprises a CMOS-receiver defining a matrix.

10. EVIDENCE APPENDIX

None.

11. RELATED PROCEEDINGS APPENDIX

None.

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